
Stem cell-based approaches to treating HIV infection.

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Public Summary:

Scientific Abstract:

PURPOSE OF REVIEW: Stem cell-based strategies for treating HIV-infected individuals represent a novel approach toward reconstituting the ravaged immune system with the ultimate aim of clearing the virus from the body. Genetic modification of human hematopoietic stem cells to produce cells that are either resistant to infection, cells that produce lower amounts of infectious virus, or cells that specifically target the immune response against the virus are currently the dominant strategies under development. This review focuses on the understanding of stem cell-based approaches that are under investigation and the rationale behind such approaches. **RECENT FINDINGS:** Significant progress has recently been made utilizing stem cell-based approaches to treat HIV infection. Ideally, a successful strategy would result in immune clearance of the virus from the body as well long-term restoration of overall immune responses to successfully combat everyday environmental antigens. Two recent clinical trials illustrate how new advances in stem cell-based approaches may propel this field forward to clinical reality: one that demonstrates that large-scale gene therapy trials can be performed in a conventional, reproducible manner; and one that demonstrates the utilization of a multipronged approach using lentiviral-based gene therapy vectors. These clinical trials serve as the foundation for the development of other technologies, discussed here, that are currently in preclinical development. **SUMMARY:** Recent advances using stem cell-based approaches to treat HIV infection have provided the impetus for a renewed and expanded interest in the development of new cell-based strategies to treat HIV infection as well as a variety of other diseases.

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